Department of Land and Natural Resources - Division of Aquatic Resources

CURRENT LINE

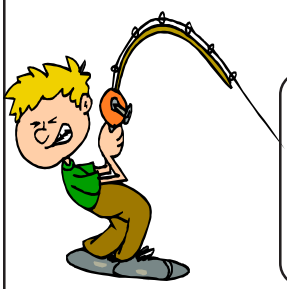
DAR Statewide Project Information Newsletter Volume 7, Number 2, September 2003

Wrapping up 2002-2003 Catfish season

The next opening for catfish fishing is in November, applications for obtaining a card will be available in October. The deadline for the August catfish cards has just passed.

The catfish population at Nuuanu is maintained with funding from the Federal Sportfish Restoration Program. Federal funds, along with State matching amounts are used in part to stock and maintain the channel catfish population in Nuuanu Reservoir. The following are the latest statistics from this year:

	Aug.02' opening	Nov.02' opening	May 03' opening
# of fishing days	16	16	18
# of anglers	2,473	1,898	2,409
# of catfish	1,060	678	1,604
total weight	3,464	2,177	3,862
avg weight	3.25 lb	3.50 lb	2.41 lb
avg length	18.15 in.	17.36 in	16.45 in
largest	18 lb 3 oz (33 in)	19 lb 8 oz (35 in)	19 lb 8 oz (35 in)

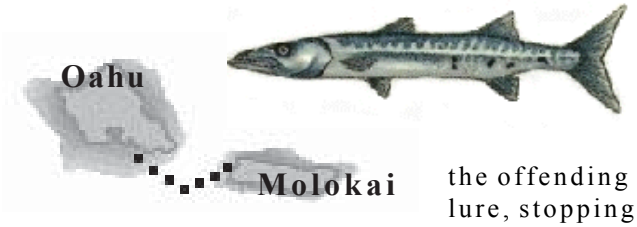


For more information on how to obtain a catfish card, call the DAR at (808)-587-0100

Kaku: the interisland traveller?

by William Puleloa

On a lazy Sunday afternoon as he has done so many times before, Robert Kikuta flicked his wrist sending his lure whistling into Manoa Stream. With measured jerks and cranks he expertly weaved his plug in and out of the grass lined banks; the ripples and bubbles of his returning decoy the only signs of life in this quiet tributary of the Ala Wai Canal. Suddenly as if to avenge the unwelcome disturbance, a fish from out of nowhere charged



the offending lure, stopping it dead in its tracks. With line hissing from his reef, Robert calmly waited for the excitement to abate before guiding the stubborn fish into his landing net. With utmost care, he gently removed the barbed contraption from the toothy mouth of an 18" barracuda, and just as carefully inserted an orange spaghetti tag under its dorsal fin. Then, with a sudden flick of its broad tail, number 6467 immediately disappeared before Robert's eyes, back into the anonymity of his watery domain.

His Sunday duties completed, Kalaupapa Settlement worker Stephen Tollefsen gathered his

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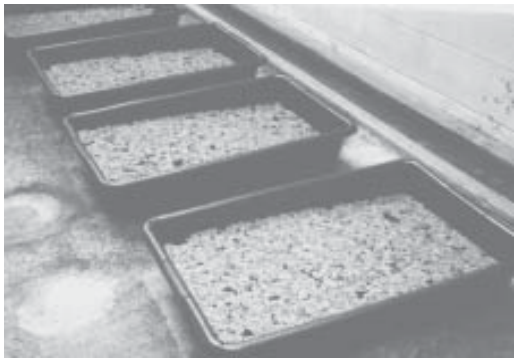
IN THIS ISSUE:

Introducing The Salvinia Weevil
The Road to a Long-term Solution
by Lisa Huynh



Photos: (Left) Ken Teramoto and Asher Ota of the Department of Agriculture. (Right) Test tubs of plants to be tested with Salvinia weevil.
Photos taken by Lisa Huynh

Residents can see the waters of Lake Wilson again thanks to months of arduous efforts to remove *Salvinia molesta* by machine and herbicide. However, the process to contain *Salvinia* for the long-term is just beginning.

In March 2003, the Department of Agriculture (DOA) and the Division of Aquatic Resources (DAR) discussed the possibility of introducing the Salvinia weevil as a biological control agent against *Salvinia molesta*. The weevil has proven its effectiveness across the globe, including Austrailia and the United States, where it has successfully and efficiently devastated *Salvinia* infestations.

Dr. Asher Ota, a retired entomologist, was hired on April 1 by the DOA and DAR to begin testing the Salvinia weevil for suitability as an agent against *Salvinia molesta*. Ota received his bachelors and masters at the University of Hawaii at Manoa and his doctorate from the University of California at Berkeley. Additionally, Ota worked at the Hawaii Planters Association for 27 years as an entomologist.

Currently, Ota is in the first phase of testing which includes growing various native and commercially significant plant species to sustain the weevils and to see if they will feed on the plants. In areas where it was previously introduced, extensive testing of the weevil produced positive results (no impacts on other plants).

Ota has grown *Salivnia molesta, Azolla filiculoides* (azolla), *Lemna spp.* (duckweed) and *Pistia stratiotes* (water lettuce) to test. The plants were chosen from a long list of proposed test plants written by Kenneth K. Teramoto of the DOA. All plants were listed in descending order of relation to *Salvinia molesta*.

Teramoto and Ota will be working together at the DOA's quarantine facility at King Street in Honolulu. Both expect that the testing will proceed steadily.

After the completion of numerous tests, which is expected to take one to three years, a report will be created. Afterwards, the report will make its way through public and administrative hearings. If the results are positive, the process of applying for necessary clearances and permits will begin.

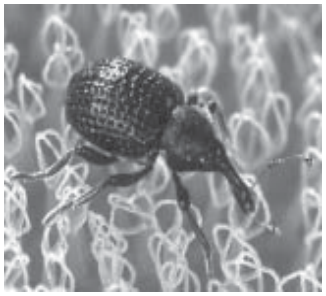


Photo: USDA, Scott Bauer

Cyrtobagous saliviniae

Origins: First discovered in the United States in Florida at the Archbold Biological Station in 1962. Although some speculate it was introduced from South America.

Length: ranging from 1.5 to 2.0 mm.

Description: Adults are typically black but newly emerged individuals may be brown.
Legs are reddish brown in coloration. The dorsal surface of the weevil is covered with numerous shallow depressions or punctures as well as yellow peltate scales.

Reproduction: The weevil is a prolific breeder. Eggs are laid singly in cavities formed by female's feeding activity. Hatching occurs in approximately 10 days. The larve are white and attain lengths of only 3mm. Total larval development requires 3 to 4 weeks.

Getting to Know Bones in Hawaii (The O'io Tagging Project)

by Bruce S. Anderson, Ph.D.

Photo: Couretsy

"There's one!" The sight of a bonefish nosing its way across the sand, the plunk of the fly as it falls in its path, the fish turning on the fly, the tug on the line as you lift your rod tip, then the sensation of line racing through your fingers–your heart starts pounding–then, if somehow you get the fish on the reel without the slack line wrapping around the reel or anything else, you realize that you might actually get it. These precious seconds make the hours wading the flats looking for bones all worthwhile.

> Some refer to them as "grey ghosts" of the flats

The sound of the thick fly line cutting through the water as the fish rips out a hundred yards of backing is sweet music to the ears of every saltwater fly fisherman. You either love the flats–and you check the tides and your calendar everyday to see if you can sneak away for a few hours–or you can't understand why anyone in their right mind would waste so much of their time doing something with so few tangible rewards. If you've read this far, you're probably in the former group.

There are probably less than two dozen hard-core fly fishermen in Hawaii. Veteran saltwater fly fishermen who call Hawaii home, Dick Gushman, Jim Romig, Kelvin Taketa, Ron Lum and others travel all over the world "chasing" bones. Enthusiastic newcomers to the sport, like me, only dream about the Seychelles, New Caledonia, Palmyra Island and some of the other exotic destinations they have fished in their travels. One thing we all share in common is that we would rather be walking the flats anywhere than doing anything–well, almost anything else.

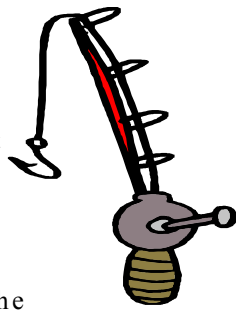
Some refer to them as "grey ghosts" of the flats. O'io, as they are known to most fishermen in Hawaii, are indeed grey or sometimes light green in appearance. They have shiny, silver scales that reflect the color of the bottom and the fish's surroundings. Without bright sunlight to cast a shadow, they are difficult to spot even if you are looking directly at them with polarized glasses.

Next to ulua, papio and other jacks, bonefish are the most sought after inshore game fish for recreational fishermen in Hawaii. Despite their popularity, little is known about their distribution, movement, or growth rates. Surprisingly, little is known about bonefish behavior worldwide. The fact that bonefish are not a commercially important food fish is one of the reasons. From this standpoint, the species is grossly undervalued as a resource.

What we know and don't know

Only the basic life cycle of bonefish has been described in the many books and articles on the subject. They travel in loose schools, route out shrimp, shellfish, crabs, and fish from the bottom for food, and spawn offshore. Eggs hatch into a ribbon-like larvae that metamorphose into fish-like form at about two inches; then, the fish move inshore. Mature fish are commonly found feeding on inshore, shallow flats, usually over mud, coral and grass and, occasionally, over white sand. Otherwise, little is known about bonefish movements or reproductive behavior.

Most fishermen do not know that there are two species of bonefish in Hawaiian waters, *Albula glossodonta,* also called "Roundjaw" bonefish, and *Albula neoguinaica,* called "Shar pjaw" bonefish. While the two have been unequivocally established as discrete species using biochemical markers and examining their internal skeletal structures, it is challenging to distinguish them by appearance. The only visible anatomical feature that differentiates the species is the shape of their lower jaws (Figure 1). The Roundjaw species generally has a broadly-rounded lower jaw. The Sharpjaw species have an angular lower jaw which is more or less pointed.



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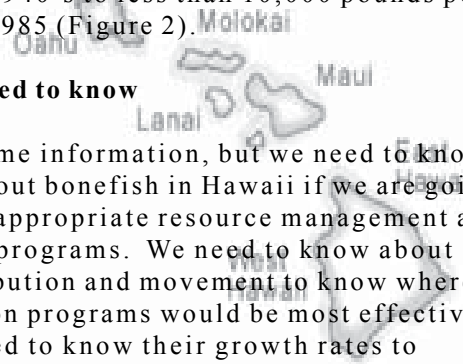
O'IO TAGGING: continued from page 3

These two species of bonefish evolved in Hawaiian waters over a period of over 30 million years. They were an important fish in Hawaiian culture. However, there is little historical information that would allow a comparison of fish populations over time and there is no historical data on recreational fishing catches in Hawaii. Only anecdotal reports from fishermen suggest the numbers of bonefish have decreased dramatically over the past two decades, presumably because of over fishing and habitat loss. We do know the number of pounds of commercial bonefish landed has decreased dramatically, from 70,000-100,000 pounds per year in the late 1940's to less than 10,000 pounds per year since 1985 (Figure 2).



What we need to know

We have some information, but we need to know a lot more about bonefish in Hawaii if we are going to develop appropriate resource management and protection programs. We need to know about their distribution and movement to know where conservation programs would be most effective. We also need to know their growth rates to determine stock maturity and reproduction rates. This is basic information needed for any conservation program intended to preserve and protect bonefish or any other species.

It is also critical that we collect this information in Hawaii. Hawaii is very different from the Gulf of Mexico and the Caribbean where other studies are underway. The geographic isolation of the individual Hawaiian Islands and long distances and deep channels between the islands provides a very different habitat than other areas where bonefish are found. In the Caribbean, for example, bonefish have been known to travel for over fifty miles. However, this is in an area where fish could swim hundreds of miles along coastlines with similar habitat without encountering substantial barriers.

The deep ocean channels between the Hawaiian Islands pose a formidable barrier and dramatically curtail bonefish movement. We will likely discover that we have much more in common with other Pacific Islands, such as Palmyra Atoll, where the Nature Conservancy has also begun a bonefish tagging project. The information we collect from this project should have relevancy elsewhere in the Pacific.

Filling the gaps

Several months ago, a group of fishermen and fisheries management experts, including Dr. Gordon Grau and Dr. Richard Brock got together to talk about ways to fill in the gaps of what we don't know about bonefish in Hawaii. With financial support from the University of Hawaii Sea Grant College Program, the O'io Tagging Project was born. It's purpose is to collect information to characterize the bonefish resource to support appropriate resource management and conservation programs.

Finally, dependent on the amount of information fishermen provide, it is hoped that this study will begin to define the "catch-and-release effort" for the fishery around Oahu. At present, there is no data available to describe fishery dynamics, the hours spent fishing, the size of the catch, or the effects of exploitation because the catches of recreational fishermen are not reported.

Tagging

The bonefish caught by those participating in the project will be tagged utilizing anchor tags and methods previously developed for the "Ulua Tagging Project" and adapted to bonefish. Annette Tagawa and Clay Tam, Education Specialists with the Division of Aquatic Resources of the Department of Land and Natural Resources, have been invaluable in providing technical guidance in this regard.

Essentially, the tagging method involves inserting a thin, polyethylene dart tag, commonly called a "spaghetti" tag, in the area high on the back of the fish. A plastic barb on the head of the dart tag keeps the tag from pulling out of the fish after it is pushed through the muscle and between the bones just below the dorsal fin.

The tag has an identifying number and telephone number to call to report information when the fish is captured. After the fish is tagged, the tag number, the species, the fork length (measured from the tip of the mouth to the fork of the tail), the date and time of capture and the location is recorded and reported. Upon recapture, the same information is recorded and

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Opae`ula: small but significant creatures of the sea

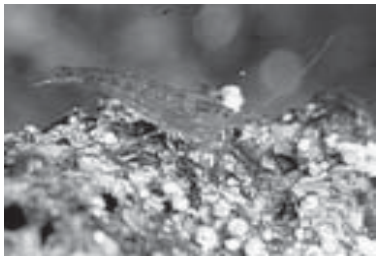

Photo: Courtesy

At first glance, opae'ula shrimp look like speckles of red particles sitting at the bottom of water surrounded by rocks and algae. Yet, leaning in for a closer look, the speckles are alive and busy. They are minute red shrimp, tiny (rarely exceeding a half-inch in length) but significant organisms within a fragile ecosystem.

ORIGINS

Opae'ula inhabit small, brackish water anchialine ponds typically found in geologically young lava fields. A mixture of seawater and freshwater from fissures in the lava feed the ponds, thus creating the home of the opae'ula. The shrimp are most abundant on the Big Island, the youngest of the Hawaiian Islands and are herbivorous. They graze on the film of algae and diatoms growing on rocks and other hard surface.

The female opae'ula produces about a dozen eggs once or twice a year. Like other opae, the female opae'ula carries her fertilized eggs attached to her swimmerets. The eggs hatch after about a month into tiny larvae that swim up in the water column. After another month the larvae metamorphose into minature versions of the adults.

In the past decades, the growing presence of exotic species has caused the shrimp to retreat to underground crevices, creating an adverse effect. In the absence of the shrimp algae grow out of control, filling ponds with debris at a greatly accelerated rate. A fish poison called rotenone has proven effective in completely removing exotic fish from achialine ponds.

Photo: Courtesy

Opae'ula have been documented as living for more than 20 years in captivity. There are several species of opae, including one blind species that inhabits ponds in the Maldives and in southern Egypt.

(continued from OPAE`ULA)

CARING FOR OPAE'ULA IN CAPTIVITY

Opae'ula have become popular, low maintenance pets. They are often found packaged in an aquarium environment labeled a biosphere, a self-sustaining eco-system.

Green or brown algae growing on the rocks and the sides of the jar produce the food and oxygen that will sustain the opae'ula. The carbon dioxide that the opae breathes out and the wastes that it produces will in turn nourish the algae. In most cases, all that's necessary is sunlight. In fact, sunlight will be the only element that will need monitoring. Direct sunlight will quickly overheat the tank and kill all of its inhabitants. A location with indirect sunlight is best.

If water for the tank ever needs to be replenished, the owner must remember that the water is slightly brackish. The recommended amounts of water is five parts of salt per 1000 parts water, or filling the jar with freshwater, and adding about a half a cup of seawater.

KAKU: continued from page 1

battered but trusty fishing pole and ambles over to the landing wharf. With the blazing sun imparting a golden hue in the western horizon, he too casually flicked his wrist and watched the whisper thin fishing line spill outward forming a graceful gossamery arch reaching into the ocean. The splashing of his spoon in the crystal clear waters startled the nearby manini, pakuikui, lau-wiliwili, mamo, kihikihi, lau-pala, and kupipi, causing them to scatter in a kaleidoscopic rainbow of color. Even before the frightened fish could recover, Stephen's lure began to flash menacingly as it jerked and twitched its way back toward the wharf. Then, as if on cue, a bolt of lightning from the azure depths came splashing after the sparkling lure. A splash of white water, followed immediately by the sound of peeling line, let Stephen know that the lightning had found its target. With his ultra light rod doubled over, Stephen slowly began retrieving his line, inch by begrudging inch.

Ten grueling minutes passed before the stubborn fish could be coaxed close enough for Stephen to discern its silvery cylindrical body. Timing each lift to coincide with the undulating surge, Stephen expertly maneuvered his rebellious prey closer and closer to the wharf. Finally, with a well-timed heave, the foot and a

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Taape and Roi: The past and present

by Lisa Huynh

In the 1950s the Division of Fish and Game (now known as the Division of Aquatic Resources) recognized a declining trend in desirable game and food fishes in the shallow inshore areas of Hawaii. The findings signaled a need to address the issue of conservation and somehow reverse the trend.

Two proposed measures followed these findings: one was "to improve the existing fish fauna through sound management measures based on research" and the other was "to augment our present fish fauna by introducing exotic game and food fishes for which ecological niches exist in Hawaii, especially from the Central and Western Pacific." (Div. of Fish & Game, Annual report of the Board of Agriculture & Foresty, Territory of Hawaii FY July 1, 1955-June 30, 1956).

Due in part to the lack of resources to collect biological data, the decision was made to fill in ecological niches by introducing some alien fish species. In addition, at the time, alien introductions were precedent across the country.

Two fish particularly successful in establishing their populations in Hawaii were taape and roi. In the decades following the introduction, native fish populations continued to decline. Rapidly, but without confirmation, taape and roi were blamed for the declining populations of more desirable native fish.

Utilizing data from past and present research, DAR aquatic biologist Bill Walsh set out to discover the truth behind the taape and roi mystery: were they the culprits in falling native fish populations as was believed for so long?

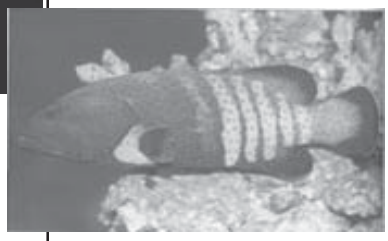
Walsh said that through careful examination he wanted to eliminate invalid problem areas for Hawaii's fisheries. Eliminating false truths, he said, would help resource managers find and focus on the real problems.

In Walsh's examination he first began comparing the catch reports from MHI commercial landings between 1900s-2000 of taape and various native fish. He overlapped the reports and in all cases the charts showed no relationship in the rise and fall of taape populations and native fish populations such as Opakapaka, Weke and U'u.

Walsh also highlighted a study of the interactions of taape with native fishery species completed by James D. Parrish, Greta S. Aeby, Eric J. Conklin and Gayla L. Ivey between September 1997 and August 2000.

The study: *Interactions of nonindigenous blueline snapper (taape) with native fishery species,* provided further support contradicting the taape and roi myth, concluding that evidence did not imply strong negative effects of taape on adult native snappers in deep-water habitats. Specifically, the researchers found that taape abundance was very patchy, that the fish showed little if any aggression toward native snappers and tended to feed mostly at night in contrast to most other snappers.

In examining the growing number of roi, Walsh looked at the September/October 2001 report compiled by the Department of Health on communicable diseases. At 17%, roi and hapu'upu'u topped a list of the "most common fishes associated with ciguatera poisoning in Hawaii: 1996-2000." Coupled with such stastics, roi has gained a reputation for being undesirable. Consequently, roi populations are possibly increasing because they are not being harvested.



Walsh brought his study full circle by noting the possible severity of Hawaii's steadily declining fisheries using Division of Aquatic Resources fishing surveys from the 1980s and 90s.

Based on these surveys, the majority of fishers statewide felt that the fishery resources are not what they used to be. However, many factors do contribute to fishery resources. Not only are fishery resources not what they used to be, but our island populations are not what they used to be either.

More development and urbanization has augmented the population. and all the attendant impacts, such as shoreline development, pollution, runoff, etc. that have an effect on nearshore habitats. In addition, more people competing for the same amount of fishery resources means a smaller piece of the pie for everyone.

The challenge for researchers and resource managers is ongoing. Problems are never singular; instead they are a series of intertwined contributing factors that make the task of identifying target areas very difficult.

****Annette Tagawa contributed to this article****

O'IO TAGGING: continued from page 3

reported. A dedicated telephone line has been set-up at Nervous Water Fly Fishers in Kaimuki to receive calls and record this important information.

To date, 12 fishermen, including professional fly fishermen Clay Yee and Kevin Faucheux at Nervous Water Fly Fishers, have volunteered to participate in this project. Because of limited supplies and equipment that could be purchased with the grant funds, a maximum of 20 participants fishermen will be recruited the first year. Our target is to tag 1000 fish over this period. It is hoped that funds will be available to continue the project and expand the number of participants over the next few years. All fishermen, of course, are encouraged to report the capture of tagged fish.

Data on the exact location fish are caught will be kept confidential; only summary statistics will be reported for areas such as Kaiaka Bay, Mamala Bay, Kaneohe Bay, etc.. This will allow detailed tracking of movement without giving away your favorite fishing spots!

What we expect to learn

It is anticipated that within a year or so, we will have some limited information on bonefish movement (in miles), dispersion, and, possibly, mixing patterns by species. Preliminary information on growth from tagging and recapture data may also be available, depending on recapture rates. As more fish are tagged, we can, of course, expect more to be recaptured. Incidentally, we plan to develop accurate and verified length and weight curves to encourage the release of fish that are caught. Using data on the date and time of capture, it may also be possible to retroactively determine environmental factors, such as tides, phases of the moon, and perhaps other factors that may influence bonefish movements and behavior.

All fishermen who participate in this program whether tagging or in recovery of tagged bonefish will be given information pertaining to that particular fish. When the fish is first caught, this will include confirmation of the date caught, the location captured, and the fork length of the fish. Upon recapture, information provided will include the date, location, and fork length of the fish and a history of its previous captures, including the days free, distance traveled (in miles) and growth (in inches) between captures. Periodic updates on the O'io Tagging Project will be in published in Hawaii Fishing News and will be available in other forms.

KAKU: continued from page 4

half long barracuda found itself flapping beside Stephen's feet. Exactly five weeks to the day 6467 had reappeared, this time off the island of Molokai! After being released by Robert Kikuta next to the Date Street bridge, 6467 found its way back to the Ala Wai Canal and swam two more miles out to sea via the Ala Wai Harbor. Once past the multitude of boats anchored in the harbor and into the salty Pacific Ocean where it was born, 6467 followed Oahu's southern coastline to Makapu Point. There, for instincts not yet understood, it ventured into the ever treacherous Kaiwi Channel to fulfill its destiny on the north shore of Molokai. After the strenuous journey of at least 60 miles, 6467 had managed to add two additional inches to his fork length.

While much is known about the life cycles of most major Hawaiian reef fish, very little has been document about their migration habits. To this end, the Division of Aquatic Resources has recently launched a series of long term projects to better understand the movement and distribution of some of Hawaii's more prominent near shore fish. Various species like the stripped mullet (ama'ama), the pink snapper (opakapaka), the barracuda (kaku), and various papio species have been tagged in order to uncover their natural migration patterns and growth rates. Moreover, special cases such as the one mentioned above may enable scientists to determine whether migrating fish from contaminated areas are in fact safe for consumption once caught elsewhere. The success of these projects hinges heavily on the efforts of dedicated volunteers such as Robert Kikuta and Steven Tollefsen. Without question, the task of recovering valuable information would be next to impossible without assistance from the fishing community.

Anyone catching a tagged fish should call State biologists at the Division of Aquatic Resources (DAR) to report the find. Those calling will be asked the fork length of the animal, the date and place of capture, and the number of the tag. To provide an added incentive, DAR is offering a small token for each tagged fish reported. The public's assistance is critical in helping us to solve the puzzle of migrating native fish. Please help us to preserve our marine resources so that future generations may partake of the same privileges we enjoy today.

DIVISION OF AQUATIC RESOURCES
DEPT. OF LAND & NATURAL RESOURCES
1151 PUNCHBOWL STREET, RM. 330
HONOLULU, HAWAII 96813

RETURN SERVICE REQUESTED

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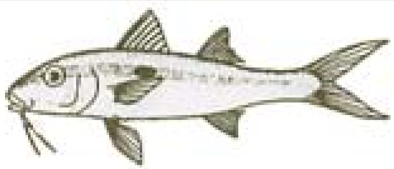
Fish Facts: *Mulloidichthys flavolineatus*

(Yellowstripe goatfish, White Weke, Weke a'a)



DESCRIPTION:
Whitish body with black spot under first dorsal fin on side embedded with yellow stripe running from head to tail. Fins vary from whitish to yellowish.

SIZES:
Length: large specimens can reach lengths of up to 18 inches.
Weight: unknown

BREEDING:
Sexual maturity & spawning: unknown

LIFESTYLE:
Habitat: Inhabits shallow sandy areas of lagoons and seaward reefs. They form schools during the day and disperse at night.
Diet: Feeds on crustaceans, mollusks, worms, heart urchins and foraminifera.
Life span: unknown

FISHING INFORMATION:
Adult white weke are caught with pole and line, lay nets, thrownets, traps, etc. Oama, juvenile white weke that measure from finger length to about six inches, are even more popular than adults. They occur in large schools in shallow sandy areas around June to about November.

****Please note the following are just ball park figures and meant only to give you a general idea on the relationship of length, weight and age.***

Fork length (inches)	Weight (pounds)	Age (years)
4	0.03	---
5	0.07	---
6	0.12	---
7	0.2	---
8	0.3	---
9	0.4	---
10	0.5	---
11	0.7	---
12	0.9	---
13	1.2	---
14	1.5	---
15	1.8	---
16	2.2	---
17	2.6	---
18	3.1	---

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